

## **DETAILED ACTION**

### ***Continued Examination Under 37 CFR 1.114***

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on March 2, 2009 has been entered.

## **EXAMINER'S AMENDMENT**

An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it **MUST** be submitted no later than the payment of the issue fee.

Authorization for this examiner's amendment was given in a telephone interview with Gunnar Leinberg on March 17, 2009.

The application has been amended as follows:

*1. A modulator/demodulator system comprising:  
a transmission system with a time scale and time delay encoding system which applies one of a plurality of time scales and one of a plurality of time delays to one of a pair of matching base signals to encode information, the transmission system combines the time scaled and time delayed base signal with the other one of the pair of base signals*

*to form a doublet, and transmits the doublet, wherein the applied one of the plurality of time scales is less than one; and*  
*a receiving system which receives the doublet and extracts information from between the time scaled and time delayed base signal and the other one of the pair of base signals based on the one of the plurality of time scales and the one of the plurality of time delays which were applied.*

*4. A modulator/demodulator system comprising:*

*a transmission system with a time scale and time delay encoding system which applies one of a plurality of time scales and one of a plurality of time delays to one of a pair of matching base signals to encode information, wherein the applied one of the plurality of time scales is less than one, wherein the transmission system further comprises a pair of synchronized and spatially separated radiating elements, one radiating element radiates one of the matching base signals and the other radiating element radiates the time scaled and time delayed base signal wherein the one of the matching base signals and the time scaled and the time delayed base signal combine during the radiation to form a doublet; and*

*a receiving system which receives the doublet and extracts information from between the time scaled and time delayed base signal and the other one of the pair of base signals based on the one of the plurality of time scales and the one of the plurality of time delays which were applied.*

*12. A modulation/demodulation method comprising:*

*applying one of a plurality of time scales and one of a plurality of time delays to one of a*

*pair of matching base signals to encode information, wherein the applied one of the plurality of time scales is less than one;*  
*combining the time scaled and time delayed base signal with the other one of the pair of base signals to form a doublet;*  
*transmitting the doublet into the environment; receiving the doublet; and extracting information from between the time scaled and time delayed base signal and the other one of the pair of base signals based on the one of the plurality of time scales and on the one of the plurality of time delays which were applied.*

*13. A modulation/demodulation method comprising:*

*applying one of a plurality of time scales and one of a plurality of time delays to one of a pair of matching base signals to encode information, wherein the applied one of the plurality of time scales is less than one;*  
*radiating one of the matching base signals from one of a pair of synchronized and spatially separated radiating elements;*  
*radiating the time scaled and time delayed base signal from another one of the pair of synchronized and spatially separated radiating elements, wherein the radiated time scaled and time delayed base signal with the other one of the pair of base signals combine during the radiation to form a doublet; receiving the doublet; and extracting information from between the time scaled and time delayed base signal and the other one of the pair of base signals based on the one of the plurality of time scales and on the one of the plurality of time delays which were applied.*

56. A receiver system for receiving transmitted information comprising:  
a receiver which receives a doublet, the doublet comprises at least two matching base signals where one of a plurality of time scales and one of a plurality of time delays are applied to at least one of the base signals to encode information before being combined with the other base signal; and  
a processing system which extracts the information from between the time scaled and time delayed base signal and the other base signal which comprise the doublet based on the one of a the plurality of time scales and the one of a the plurality of time delays which were applied, wherein the applied one of the plurality of time scales is less than one,  
wherein the receiver further comprises a device that time scales a received signal from the doublet by the time scale that was applied to form a time scaled version of the received signal, a correlator that correlates the received signal with the time scaled version of the received signal to form a time delay correlation signal, a detector that detects the peaks of this time delay correlation signal, and an estimator that uses the time delay locations of the peaks to estimate the angle of arrival of each of the received signals.

57. A receiver system for receiving transmitted information comprising:  
a receiver which receives a doublet, the doublet comprises at least two matching base signals where one of a plurality of time scales and one of a plurality of time delays is applied to at least one of the base signals to encode information before being combined with the other base signal; and

*a processing system which extracts the information from between the time scaled and time delayed base signal and the other base signal which comprise the doublet based on the one of a the plurality of time scales and the one of the plurality of time delays which ~~was~~ were applied to the doublet prior to transmission, wherein the applied one of the plurality of time scales is less than one;*

*wherein the receiver receives a plurality of the doublets in a composite signal and the processing system extracts the information from the composite signal based on the one of the plurality of time scales and the one of the plurality of time delays which ~~was~~ were applied to at least one of the base signals in each of the doublets.*

*59. A receiver system for receiving transmitted information comprising:*

*a receiver which receives a doublet, the doublet comprises at least two matching base signals where one of a plurality of time scales and one of a plurality of time delays is applied to at least one of the base signals to encode information before being combined with the other base signal; and*

*a processing system which extracts the information from between the time scaled and time delayed base signal and the other base signal which comprise the doublet based on the one of a the plurality of time scales and the one of the plurality of time delays which ~~was~~ were applied to the doublet prior to transmission, wherein the applied one of the plurality of time scales is less than one;*

*wherein the processing system further comprises:*

*a segmentation device that receives the doublet and forms received segments from the received doublet;*

*a time scaling device which applies at least one of the plurality of time scales to each of the received segments to form time scaled signal segments;*

*a time delaying device which applies at least one of the plurality of time delays to each of the received segments to form time delayed signal segments;*

*a multiplier which multiplies each of the time scaled signal segments with each of the time delayed signal segments to form multiplied signals; and*

*an integrator which integrates the multiplied signals across time to form detection signals, the processing system comparing the detection signals at different ones of the plurality of time scales and different ones of the plurality of time delays over time to determine the applied one of the plurality of time scales and the applied one of the plurality of time delays to extract the information from the detection signal.*

*60. A receiver system for receiving transmitted information comprising:*

*a receiver which receives a doublet, the doublet comprises at least two matching base signals where one of a plurality of time scales and one of a plurality of time delays is applied to at least one of the base signals to encode information before being combined with the other base signal; and*

*a processing system which extracts the information from between the time scaled and time delayed base signal and the other base signal which comprise the doublet based on the one of a the plurality of time scales and the one of the plurality of time delays which ~~was~~ were applied, wherein the applied one of the plurality of time scales is less than one;*

*wherein the receiver further comprises: a temporal equalizer which substantially*

*assures that signal energy of the matching base signals is evenly distributed across the duration of the at least two matching base signals; and  
a spectral equalizer which substantially assures that the signal energy is evenly distributed across the spectrum of the at least two matching base signals.*

*62. A receiving method for receiving information comprising:  
receiving a plurality of doublets contained in a composite signal, each  
of the doublets comprises at least two matching base signals where one of a plurality of time scales and one of a plurality of time delays is applied to at least one of the base signals to encode information before being combined with the other base signal; and  
extracting information from the composite signal based on the one of a the plurality of time scales and the one of the plurality of time delays which ~~was~~ were applied to at least one of the base signals in each of the doublets, wherein the applied one of the plurality of time scales is less than one.*

*65. A receiving method for receiving information comprising:  
receiving a doublet, the doublet comprises at least two matching base signals where one of a plurality of time scales and one of a plurality of time delays is applied to at least one of the base signals to encode information before being combined with the other base signal; and  
extracting information from between the time scaled and time delayed base signal and the other base signal which comprise the doublet based on the one of a the plurality of*

*time scales which ~~was~~ were applied, wherein the applied one of the plurality of time scales is less than one;*

*wherein the information comprises imaging data embedded by an environment in which the doublet was transmitted.*

*66. A receiving method for receiving information comprising:*

*receiving a doublet, the doublet comprises at least two matching base signals where one of a plurality of time scales and one of a plurality of time delays is applied to at least one of the base signals to encode information before being combined with the other base signal; and*

*extracting information from between the time scaled and time delayed base signal and the other base signal which comprise the doublet based on the one of a the plurality of time scales and the one of a the plurality of time delays which were applied, wherein the applied one of the plurality of time scales is less than one;*

*wherein the extracting further comprises: segmenting the received doublet to form received segments;*

*applying at least one of the plurality of time scales to each of the received segments to form time scaled signal segments;*

*applying at least one of the plurality of time delays to each of the received segments to form time delayed signal segments;*

*multiplying each of the time scaled signal segments with each of the time delayed signal segments to form multiplied signals; and*



*integrating the multiplied signals across time to form detection signals, wherein the extracting further comprises processing the detection signals at different ones of the plurality of time scales and different ones of the plurality of time delays over time to determine the applied one of the plurality of time scales and the applied one of the plurality of time delays to extract the information from the determined detection signal.*

*67. A receiving method for receiving information*

*comprising:*

*receiving a doublet comprising a combined pair of matching base signals where one of a plurality of time scales and one of a plurality of time delays is applied to at least one of the base signals to encode information before being combined with the other base signal;*

*extracting information from between the time scaled and time delayed base signal and the other base signal which comprise the doublet based on the one of a the plurality of time scales and the one of the plurality of time delays which was were applied, wherein the applied one of the plurality of time scales is less than one;*

*substantially assuring that signal energy of the pair of matching base signals is evenly distributed across the duration of the pair of matching base signals following the receiving; and*

*substantially assuring that the signal energy is evenly distributed across the spectrum of the pair of matching base signals following the receiving.*

*68. A receiving method for receiving information*

*comprising:*

receiving a doublet comprising a combined matching base signals where one of a plurality of time scales and one of a plurality of time delays is applied to at least one of the base signals to encode information before being combined with the other base signal; and extracting information from between the time scaled and time delayed base signal and the other base signal based on the one of a the plurality of time scales and the one of the plurality of time delays which was were applied to, wherein the applied one of the plurality of time scales is less than one.

92. A method for imaging comprising:

applying one of a plurality of time scales and one of a plurality of time delays to one of a pair of matching base signals to encode information, wherein the applied one of the plurality of time scales is less than one;

combining the time scaled and time delayed base signal with the other one of the pair of base signals to form a doublet;

transmitting the doublet into the environment that embeds imaging information;

receiving the doublet; and extracting the imaging information from doublet between the time scaled and time delayed base signal and the other one of the pair of base signals based on the one of the plurality of time scales and on the one of the plurality of time delays which were applied.

93. A method for imaging comprising:

applying one of a plurality of time scales and one of a plurality of time delays to one of a

*pair of matching base signals to encode information, wherein the applied one of the plurality of time scales is less than one;*  
*radiating one of the matching base signals from one of a pair of synchronized and spatially separated radiating elements;*  
*radiating the time scaled and time delayed base signal from another one of the pair of synchronized and spatially separated radiating elements, wherein the radiated time scaled and time delayed base signal with the other one of the pair of base signals combine during the radiation to form a doublet; receiving the doublet; and extracting the imaging information from ~~the~~ doublet between the time scaled and time delayed base signal and the other one of the pair of base signals based on the one of the plurality of time scales and on the one of the plurality of time delays which were applied.*

**Allowable Subject Matter**

Claims 1-21, 56-60, 62, and 65-128 are allowed. The following is an examiner's statement of reasons for allowance: see the applicant's remarks dated March 2, 2009.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to FRESHTEH N. AGHDAM whose telephone number is (571)272-6037. The examiner can normally be reached on 9:00-5:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Chieh Fan can be reached on 571-272-3042. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/F. A./

Examiner, Art Unit 2611

/Chieh M Fan/

Supervisory Patent Examiner, Art Unit 2611

